

## CLAIMS

1. A miniaturized device for the storage and/or enrichment of molecules and/or atoms, especially for a miniaturized gas chromatograph characterized by a chamber (1) with a filling material (2), the filling material (2) consisting of or containing carbon nanotubes and/or carbon nanofibers, and wherein the filling material (2) is covered by at least one layer of amorphous carbon (5), thus forming the chamber (1), and wherein the chamber (1) comprises an inlet (3) and an outlet (4) for the delivery and extraction of a sample of molecules or atoms.
2. The miniaturized device according to claim 1 characterized in that the filling material (2) is porous.
3. The miniaturized device according to one of claims 1 or 2 characterized in that the chamber (1) is formed on a carrier (6).
4. The miniaturized device according to claim 3 characterized in that the chamber (1) is located on the surface of a carrier (6) or that it is embedded in the surface of the carrier (6).
5. The miniaturized device according to claim 3 or claim 4 characterized in that the carrier (6) is a silicon wafer.
6. The miniaturized device according to any of the preceding claims characterized in that a heating unit (7) is provided.

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7. The miniaturized device according to claim 6 characterized in that the heating unit (7) is located opposite to the side of the surface of the carrier (6) with the chamber 1.

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8. The miniaturized device according to any of the preceding claims 6 or 7 characterized in that the heating unit (7) comprises a resistive heating element produced via thick-film or thin-film technology.

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9. The miniaturized device according to any of the preceding claims characterized in that a cooling unit (8) is provided.

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10. The miniaturized device according to claim 9 characterized in that the cooling unit (8) comprises a Peltier-element.

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11. The miniaturized device according to claim 9 or claim 10 characterized in that the cooling unit (8) is located opposite to the side of the surface of the carrier (6) with the chamber (1).

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12. The miniaturized device according to claim 11 characterized in that the cooling unit (8) is located in a recess (9) of the carrier (6).

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13. The miniaturized device according to any of the preceding claims characterized in that the chamber (1) is formed in a shape of a channel.

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14. The miniaturized device according to any of the preceding claims characterized in that the outlet (4) can be connected to the inlet of a separation column.

5 15. A process for the production of a miniaturized device for the storage and/or enrichment of molecules and/or atoms, especially for a miniaturized gas chromatograph characterized by the following steps :

10 a) Deposition of at least one layer of filling material, which consists of or contains nanoscale carbon nanotubes, carbon nanofibers and/or fullerenes on to a carrier and

b) Covering of said at least one layer of filling material with at least one layer of amorphous carbon, whereby the layer of filling material and the layer of amorphous carbon are deposited in such a way onto the carrier that a channel is formed between the carrier and the layer of amorphous carbon, the channel containing the filling material, and whereby two openings are structured into the carrier which can be used to connect the channel to the outside world.

16. The process according to claim 15 characterized in that the layer of filling material and the layer of amorphous carbon are deposited via Plasma Enhanced Chemical Vapor Deposition (PECVD).

17. The process according to any of the preceding claims 15 or 16 characterized in that the area of the carrier, where the layer of filling material is deposited, is pre-defined by a catalyst layer of structured transition metal, previously deposited on the carrier.

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18. The process according to claim 17 characterized in that iron, nickel or cobalt is used as the transition metal.

5 19. The process according to any of the preceding claims 15 or 18 characterized in that a silicon wafer is used as a carrier.

10 20. Use of a miniaturized device according to any of the preceding claims 1 to 14 for the storage and/or enrichment of molecules and/or atoms for the purpose of analysis of the molecules or atoms.

15 21. Use according to claim 20 characterized in that molecules or atoms are stored and/or enriched from a fluid stream, preferably a gas stream.